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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,513

10/26/2005

David B Smathers

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33805 7590 01/23/2008  
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EXAMINER

YANG, JIE

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/527,513		SMATHERS ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
	Jie Yang		1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/13/2005</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

Application claims benefit of the filing date (Sept. 13, 2002) of the prior provisional application (60/410,607).

### ***Election/Restrictions***

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-3, drawn to a composition comprising Me, Si<sub>3</sub>N<sub>4</sub> and sintering aid.

Group II, claim(s) 4-13, drawn to a product of sputtering target with the composition of Me, Si<sub>3</sub>N<sub>4</sub> and sintering aid.

Group III, claim(s) 14-20, drawn to a method of making a sputtering target with the composition of Me, Si<sub>3</sub>N<sub>4</sub> and sintering aid.

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: they lack the same unity a posteriori because the common feature of "composition: Me, Si<sub>3</sub>N<sub>4</sub> and

sintering aid" is known in the art. Yoshimura (US 6,911,162 B2, thereafter US'162) discloses silicon nitride powder sintering with metal powder (Abstract of US'162). US'162 further teaches using  $Y_2O_3$  and  $Al_2O_3$  as sintering aid (Example 1 of US'162). Invention I-III lacks the same or corresponding special technical feature. Therefore unity of invention is lacking and restriction is appropriate.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

A telephone call was made to Mr. Bruce Peacock on Jan. 16, 2008 to request an oral election to the above restriction requirement, and result in an election of Group III claim(s) 14-20, drawn to a method of making a sputtering target with the composition of Me,  $Si_3N_4$  and sintering aid with traverse. Refer to the restriction/election requirement list above. The restriction is appropriate. Therefore, claims 1-13 are withdrawn from consideration as being directed to a non-elected group and claims 14-20 are pending for examination.

The election of an invention or species may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-20 are rejected under 35 U.S.C. 103(a) as obvious over Yoshimura (US 6,911,162, thereafter US'162) in view of Miyanaga et al (US 6,544,917, thereafter US'917).

Regarding claims 14, 19-20, US'162 teaches a method to make a silicon nitride composite sintered body (Col.1, lines 9-13 of US'162). US'162 teaches selecting metal powder from Group IVa(Ti, Zr, or Hf), Group Va (V, Nb, or Ta) and Group VIa (Cr, Mo, or W) of the Periodic Table (Col.3, lines 50-56), which reads on the limitation of a) in the instant claim. US'162

teaches preparing a silicon nitride powder, a metal powder and a powder of sintering aids, which reads on the limitations of b) providing  $\text{Si}_3\text{N}_4$  powder and c) providing a sintering aids in the instant claim 14.

Still regarding limitation c) of the instant claim 14, US'162 teaches using  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  as sintering aids (Col.5, lines 45-67 of US'162). But US'162 does not specify the sintering aid selected from  $\text{MgO}$  and  $\text{SiO}$ . However  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  are substituting<sup>e</sup>~~ing~~ equivalents to  $\text{MgO}$  and  $\text{SiO}$  in term of sintering aids, which is evidenced by US'917. US'917 teaches providing a slurry composition suitable for the manufacture of  $\text{Si}_3\text{N}_4$  sintered bodies (Abstract of US'162). US'917 teaches "Oxides, nitrides, and oxynitrides of at least one element selected from Ca, Sr, Mg, Al, Y, La, Sm, Nd, Yb, and Ce, or their precursors or complexes can be used as the sintering aid". (Col.5, lines 41-53 of US'917). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  with  $\text{MgO}$  as a sintering aid in process of US'162, because  $\text{MgO}$  would be functional equivalents to  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  as the sintering aids, as evidenced by US'917 and success could be expected. See MPEP 2144.06.

US'162 teaches grinding /mixing the powders to make a mixed powder (Col.4, lines 7-22 of US'162), which reads on the blending step d) in the instant claim 14. US'162 further teaches the molded body is sintered at a temperature range from 1100 to 1700°C in a non-oxidative atmosphere and the sintered body has a density 95% or more; US'162 also teaches the sintering may be carried out under a pressure (Col.5, lines 5-27 of US'162), which reads on the limitations e) in the instant claim 14 and the limitation of claims 19-20.

Regarding the preamble of "making a sputtering target" as recited in the instant claim, which is recognized as an intended use of the sintered body and does not add patentable weight for the instant process claims. See MPEP 2111.02 II.

Regarding claim 15, US'162 teaches a further electric discharge machining for the sintered body (Col.7, lines 16-23 of US'162).

Regarding claim 16, US'162 teaches metal powders contain 5-60% by volume (Col.1, line 58 to col.2, line 7; Col.2, line 62 to Col.3, line 9 of US'162), which overlaps the 40 to 80 atomic percent Me in the mixed powder as claimed in the instant claim. US'162 further teaches adding sintering aids  $Y_2O_3$  of 2.5% by weight and  $Al_2O_3$  of 1% by weight, respectively related to the

weight of silicon nitride were prepared (Col.5, lines 50-67 of US'162), which is within the sintering aid weight percentage as claimed in the instant claim.

Regarding claim 17, US'162 teaches the metal could be W (Col.3, lines 50-56 of US'162).

Regarding claim 18, US'162 teaches sintering in a non-oxidative atmosphere and pressure operation, which reads on the limitation of the instant claim.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

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